

THURSDAY, JULY 26, 1900.

TRADE IN ANCIENT ASSYRIA.

*Babylonians and Assyrians: Life and Customs.* By the Rev. A. H. Sayce. The Semitic Series. Vol. vi. Pp. x + 273. (London: John C. Nimmo, 1900.)

THIS little book belongs to a projected series of volumes which we gather are intended to deal with the Babylonians and Assyrians and other allied Semitic races, "the object of the series" being, according to the prospectus, "to state its results in popularly scientific form." The volume assigned to Prof. Sayce, which is the first of the series to make its appearance, describes the life and customs of the Babylonians and Assyrians, a subject which offers many points of interest to the general reader. Moreover, within recent years much new material has been published which has thrown considerable light on the social condition of the Babylonians and Assyrians during both the earlier and the later periods of their history. Thousands of clay tablets, which were unearthed at Telloh in Southern Babylonia and have found their way into the museums of Europe, contain temple-records, lists and inventories, receipts and tablets of accounts, and furnish a glimpse of the daily life of the early inhabitants of Babylonia at about 2500 B.C. The letters and commercial documents of the period of the First Dynasty of Babylon enable us to form a still more intimate acquaintance with the life of the Babylonians under some of the earliest of their Semitic kings; while the systematic publication of the legal and epistolary literature in the great collection of tablets from Kouyunjik has increased our knowledge of the social condition of Mesopotamia under the later Assyrian kings. Finally, the large collections of tablets of the Neo-Babylonian and Persian periods, which are now available for study, make it possible to trace the development of laws and customs down to the latest periods of Babylonian history. There is, therefore, no lack of material on which to base a sketch of the manners and customs of the Babylonians and Assyrians.

Prof. Sayce has written many popular books on this subject, and he is well qualified for the task he has undertaken; but we cannot help wishing that in one important point he had modified the plan on which he has compiled his volume. The book deals largely with small details, containing descriptions of sales of houses and lands and property, deeds of partnership, marriage contracts, receipts, records of loans, and numerous other commercial and legal transactions drawn from the thousands of "contract tablets" which have been published in various monographs and in the transactions and journals of different societies. Any book describing the life and customs of the Babylonians must necessarily draw upon this large and scattered literature in order to illustrate the general conclusions which the writer formulates. Prof. Sayce has made abundant use of this material, quoting and describing tablets freely; on p. 16, for instance, in one short paragraph, he refers to no less than nine separate documents of different dates. But

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from the first page to the last he has not given a single reference to the works in which the various tablets have been published, or any indication by which they might be identified; in fact, not including Biblical quotations, we have only found two references in the book (on pp. 1 and 66), and these are to the opinions of modern writers and not to original authorities. This is perhaps not Prof. Sayce's fault, but a defect in the general plan of the series, for it is possible that the editor has ruled that references to authorities are incompatible with "a popularly scientific" treatment. But, whoever may be responsible, this defect detracts largely from the value of the book. No doubt the expert knows already where to look for the original texts quoted, and can control the various statements for himself; but the series is not meant for the expert. In the editorial preface, we are expressly told that it is intended to "be serviceable to students in colleges, universities, and theological seminaries, to the clergy, and to intelligent lay readers." The object of the work is, therefore, essentially educational; but without references it can prove but a poor guide or introduction to the study of the subject of which it treats.

Although doubtless hampered by this deficiency in the general plan of the work, Prof. Sayce has produced a very readable, though perhaps a rather rambling, little book. He has written attractively on the general character of Babylonia and its inhabitants, the constitution of the family, the system of education, commercial and social life, laws and government, letter-writing and religion. To treat all these subjects fully in some two hundred and sixty octavo pages is, of course, impossible; but the author has touched his subjects lightly, and some of his chapters contain valuable summaries, as, for example, that in which he describes the legal condition of women in Babylonia. The plan of writing vaguely without reference to authorities, however, is not conducive to strict accuracy, and we occasionally meet with a rather misleading generalisation. The statement on p. 102, for instance, that

"no deed was valid without the seal or mark of the contracting parties"

is not borne out by the facts, for many deeds of different periods are extant which bear neither seal-impression nor nail-mark. On p. 61 we are told that

"the year was divided into twelve months of thirty days each, an intercalary month being inserted from time to time . . ."

Even for the Assyrian period this statement is probably not accurate, and it takes no account of the changes which the calendar underwent in the long course of Babylonian and Assyrian history. The arrangement of the calendar and the method of harmonising the lunar and solar years are not yet accurately known in many of their details and are still subjects of controversy, but the student would not gather this from Prof. Sayce's statement. The evidence for cremation (pp. 62 ff.) among the Babylonians and Assyrians is far from being conclusive, and many scholars hold that it was not practised in Mesopotamia before the Parthian period. The statement

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on p. 51 that the writing of the scribes was sometimes so minute that magnifying glasses were used for reading by the Assyrians, and that short sight "must have been common in the Babylonian schools," is, to say the least, rather fanciful, the only evidence for the statement being a circular crystal object found by Layard at Nineveh, and thought to be a lens, but the use of which is unknown. That there was ever "a monotheistic school" at Erech (p. 262) would, we think, be difficult to prove, and the evidence for "human sacrifice" referred to on p. 103 should surely have been given. It is, no doubt, a consequence of the omission of references that we sometimes come across repetitions in the book, as, for instance, the quotation referring to the Chaldeans and their ships in connection with Eridu on pp. 9 and 183; the suggested identification of Sar-ilu with Israel on pp. 17 and 191, the description of the letter referring to a ferry-boat on pp. 186 and 215, &c. Misprints, too, are not uncommon, as, for example, "the eighteen-hundredths part" (p. 114), "I will lie up five shekels of silver" (p. 225), "Emutalum" for "Emutbalum" (p. 211), "weight" for "night" (p. 266), "bears" apparently for "beasts" (p. 52), "cunei-plain" apparently for "plain" (p. 211), and on p. 157 we are told that "Aramaic became the *lingua franca* . . . in the commercial world." Prof. Sayce is probably not to blame for such misprints, for the American editor was doubtless responsible for the correction of the proof-sheets.

#### ELECTRICAL ORGANS. MUSCLE OR NERVE?

*Beiträge zur Physiologie des elektrischen Organes der Zitterrochen (Torpedo).* By Siegfried Garten. Pp. 116, 4 plates. (Leipzig: Teubner, 1899.)

ALTHOUGH electrical fishes have been the object of scientific curiosity and investigation for nearly 300 years, it is only in the last half of this century that physiologists have realised the great importance, for general physiological problems, of the phenomena presented by these remarkable animals. The discovery and investigation of the electrical phenomena accompanying excitation or activity of all the excitable tissues in the animal body have rendered it of supreme importance to attack the problem and the causation of these electrical changes in the organ, where the "electrical function," so to speak, attains its highest degree of development. It seems probable that electrical organs may be developed by the transformation of many different kinds of tissue. In the greater number of these fishes, however, including that which is the subject of the memoir under consideration (*Torpedo*), the organ is formed by a transformation of embryonic muscle-fibres, accompanied by a disappearance of the cross-striated contractile material, with a great hypertrophy of the nerve-endings. The electrical discharge of the organ, with an E.M.F. probably amounting to 100 to 200 volts (Gotch) and lasting about 6/1000 of a second, may be excited reflexly or by excitation of the nerve to the organ, or, using strong shocks, by stimulation of the organ itself. The direction of the current in the fish is from ventral to dorsal surface. The electrical organ in

the torpedo consists of an array of columns, each column being composed of about 400 transverse discs representing the electromotive elements of the organ. On the ventral surface of each of these discs we find the complicated terminal arborisation or network of a nerve-fibre, embedded in granular protoplasm, and separated from the disc by the remains of the primitive muscle-fibre from which the organ was developed.

We must assume that it is in consequence of these structural arrangements that the excitatory electrical change in the whole organ, instead of passing from one end to the other as a wave, and so giving rise to a diphasic variation of small extent, causes merely a change in one direction, which is summated in proportion to the number of discs in the pile, so producing a monophasic variation of considerable E.M.F. It is evident that we could conceive of each disc as consisting of an inferior part, which is excitable and therefore capable of the chemical changes associated with excitation, and of a superior part, structurally and chemically continuous with the inferior, but incapable of excitation. The question at once arises whether these two parts are represented by nerve and muscle, or whether the chief excitatory change takes place in some of the structures derived from the embryonic muscle-fibre. Is the electrical change an action current of nerve-ending or of muscle?

Du Bois Reymond, for theoretical reasons, supported the latter view, and at the same time laid great stress on a remarkable property of the organ. He found that the electrical conductivity of the organ was greater for homodromous currents, *i.e.* those in the direction of the discharge of the organ, than for heterodromous. It was shown later by Gotch that this irreciprocal conductivity is only apparent, Du Bois Reymond's results being due to the fact that, in measuring the current passing through the organ, he was measuring the algebraic sum of the battery current and the current excited in the organ itself. Naturally, therefore, the homodromous current was greater than the heterodromous.

Gotch has also drawn attention to the fact that in the electrical organ we have an opportunity of deciding the nature of the demarcation-current consequent on injury. Since in this organ the demarcation-current is always in the same direction as the excitatory-current, whatever may be the position of the injury, he concludes that the demarcation-current or current of rest is really in all cases an action-current due to the continued stimulation at the seat of injury.

On these three questions, but especially with regard to the nervous or muscular nature of the excitable tissue, additional evidence is furnished by Garten, whose research is devoted chiefly to the elucidation of three points—the effect of nerve-section and subsequent degeneration on the direct excitability of the electrical organ; the effect of drugs, such as curare, which are direct poisons for nerve-endings; and the action of veratrin as a specific muscular poison.

The results of these experiments are a strong confirmation of the views put forward by Gotch. During the first eight days after section of the nerves, the organs can be excited either directly or indirectly; from the eighth